

## **Severe Acute Respiratory Syndrome (SARS) Update**

### **Current CDC SARS Case Definition**

The previously reported CDC SARS case definition has been updated to include only those individuals with a recorded fever  $> 38^{\circ}\text{C}$  and travel to areas with suspected or documented community transmission of SARS (this excludes areas where only nosocomial or household transmission has been documented).

The current case definition (as of 3/30/03) is:

A person presenting with a respiratory illness of unknown etiology with an onset since February 1, 2003 that includes:

- A measured temperature  $> 100.4^{\circ}\text{F}$  ( $38^{\circ}\text{C}$ )

**AND**

- One or more respiratory signs or symptoms, including cough, shortness of breath, difficulty breathing, hypoxia, or radiographic findings of pneumonia or respiratory distress syndrome

**AND**

- Either recent travel to areas reporting community transmission of SARS (see below) **or** close contact with a person with respiratory illness after travel to a SARS area or suspected of having SARS

Areas with suspected or documented community transmission of SARS currently include Hong Kong and mainland China; Hanoi, Vietnam and Singapore.

### **Report Possible SARS Cases to the Tennessee Dept of Health**

All suspect cases of SARS should be reported immediately to the Local/ Regional Health Department and the State Health Department on 615 741 7247.

### **Preliminary Clinical Description of SARS**

As of March 29, 2003, 1550 SARS cases have been reported to the WHO, including 62 suspect cases in the United States. According to reports from the CDC and WHO, the majority of patients meeting the SARS case definition have been adults (ages 25 to 70 years). The incubation period is typically 2 to 7 days (although a few cases suggest an incubation period up to 10 days). The illness generally begins with fever, often associated with chills and rigors and might be accompanied by other symptoms, including headache, myalgias and malaise. Typically, rash, neurologic and gastrointestinal findings are absent. Some patients have mild respiratory symptoms at the onset of illness. At day 3 to 7 of illness, a respiratory phase begins, with non-productive cough and/or dyspnea, which may progress to cause hypoxia that is severe enough to require endotracheal intubation in approximately 10% to 20% of cases. The case-fatality rate among persons meeting the current case definition of SARS is approximately 3%.

Chest radiographs are often normal during the febrile prodrome (and may remain so during the entire illness), but interstitial infiltrates, both local and generalized, may be seen during the respiratory phase. Consolidations can be seen on chest radiographs obtained in the later stages of SARS.

Complete blood counts may reveal a normal (or sometimes decreased) total white blood cell count, but the absolute lymphocyte count is often decreased. During the peak of the respiratory phase, leukopenia and thrombocytopenia (50,000 – 150,000/*ul*) is seen in approximately half of patients.

Other laboratory abnormalities include elevated creatine phosphokinase (as high as 3,000 IU/L) and hepatic transaminase levels (2 to 6 times the upper limit of normal). In most patients, renal function has remained normal.

The course of SARS is highly variable, ranging from mild, self-limited illness to death. The majority of close contacts to SARS cases remain well, though some have reported a mild febrile illness without a respiratory component and others have developed SARS. Most secondary cases have occurred among health care workers who were not using adequate infection control precautions.

The etiology of this syndrome is not yet known. Last week, several WHO reference laboratories identified a human paramyxovirus in clinical material from suspect SARS patients. However, the CDC reported that a previously unrecognized coronavirus may cause SARS (Coronaviruses are a common cause of mild to moderate upper-respiratory illness in humans and are responsible for approximately one third of common colds). Additional laboratory analyses at these research laboratories worldwide will be needed to more definitely determine the cause of this global outbreak.

At present, the most efficacious treatment regime for SARS is not yet known; treatment regimens have included antibiotics directed at bacterial causes of atypical pneumonia and antiviral agents (including ribavirin or oseltamivir) with variable responses. Steroids have been administered in conjunction with antimicrobials in some cases.

### **Guidelines for Triage and Screening of Patients for SARS**

To facilitate identification of patients who may have SARS, patients presenting with acute infectious illnesses should be questioned regarding fever and respiratory symptoms, as well as for recent travel history, at triage or as soon as possible after patient arrival. Healthcare workers who are the first point of patient contact (e.g., triage nurses) should be trained to recognize a potential case of SARS by screening individuals with fever and respiratory symptoms for:

- Travel to Hong Kong and mainland China; Hanoi, Viet Nam and Singapore within the 10 day period prior to symptom onset **or**
- Contact with someone with possible SARS within the 10-day period prior to symptom onset.

If a suspect case of SARS is identified, a surgical mask should be placed on the patient, and contact and airborne precautions should be implemented. Contact precautions include the use of gloves, gown and eye protection. Airborne precautions include placing the patient in a negative pressure room, and the use of N-95 (or equivalent) disposable filtering respirators for all individuals entering the negative pressure room. When respirators are not available, healthcare workers evaluating and caring for a patient with suspect SARS should wear a surgical mask.

CDC infection control guidelines for a suspect SARS patient in the inpatient and outpatient setting can be found at the following website: <http://www.cdc.gov/ncidod/sars/infectioncontrol.htm>

Infection Control or Occupational Health clinicians should contact the Tennessee Dept. of Health if any healthcare worker who had close contact with a suspect SARS case develops fever and/or respiratory illness within 10 days of last patient contact.

**Isolation Precautions for Any Suspect or Probable Cases:**

Suspect cases should wear a surgical mask and s/he should be escorted directly to the airborne infection isolation room. Ensure that the airflow is negative pressure. Providers should wear an N-95 mask (or surgical mask if N-95 is not available) during evaluation. *Infection control personnel should be immediately notified regarding the suspect case.* If not already involved, consultations should be requested from an infectious disease specialist.

**As secondary spread to healthcare workers has occurred in the outbreaks in Asia and Toronto, Canada, and the etiology is unknown, all suspect case-patients should be isolated in an airborne infection isolation room.<sup>1</sup> All staff and visitors entering the room should adhere to both airborne and contact precautions.**

<sup>1</sup>Airborne infection isolation rooms are defined as negative pressure isolation rooms with a minimum of 6-12 air exchanges per hour and direct exhaust to the outside which is located more than 25 feet from an air intake and from where people may pass (if air cannot be exhausted directly to the outside more than 25 feet from an air intake and from where people may pass, then air should be filtered through an appropriately installed and maintained HEPA filter).

Standardized isolation signs noting the need for airborne and contact precautions should be displayed outside the case-patient's room. As the etiology is unknown all staff and visitors entering the room are instructed in the meaning of contact, airborne and standard precautions. All hospital staff (including transport personnel) and visitors must don contact and airborne personal protection equipment prior to entering a suspected patient's room (i.e., disposable gloves and gowns and an N-95 or higher respirator). When caring for patients, health care providers should wear eye protection for all patient contact. Standard precautions include careful attention to hand hygiene. These precautions should be maintained until the etiology and route of transmission for this illness are known.

**Biosafety Precautions**

**Special care should be taken during procedures likely to induce aerosols, such as nebulized medication treatments, sputum induction, bronchoscopy, airway suction and endotracheal intubation. Up-to-date guidelines for the handling and processing of clinical specimens associated with SARS can be found on the CDC website: <http://www.cdc.gov/ncidod/sars/ic.htm>**

**Laboratory Testing:**

Clinicians should evaluate any patient suspected of meeting the above CDC case definition for SARS. The initial diagnostic testing should include chest radiograph, pulse oximetry, complete blood counts, blood cultures, sputum Gram's stain and bacterial culture, and nasopharyngeal, throat swabs, sputum, or other respiratory specimens for testing for viral respiratory pathogens (including influenza A and B and respiratory syncytial virus). If bronchoscopy, transtracheal and/or lung biopsy are performed, both fresh, frozen tissue and formalized specimens should be obtained for testing at CDC and other reference laboratories.

Clinicians should save any available clinical specimens (respiratory, blood and serum) for additional testing until a specific diagnosis is made. Additional information is available on <http://www.cdc.gov/ncidod/sars/specimens.htm>

For patients meeting the CDC case definition the Tennessee Dept. of Health (phone 615 741 7247) will provide additional information on appropriate specimen collection at the time of consultation. We will also arrange rapid transport of these specimens to the Tennessee State Public Health Laboratory for shipment to the CDC and other reference laboratories. For cases that do not meet the case definition we will provide consultation.

Any fatal cases meeting the CDC case definitions must be reported immediately the Tennessee Dept. of Health (phone 615 741 7247).

### **Treatment:**

Because the etiology of these illnesses has not yet been determined, no specific treatment recommendations can be made at this time. Empiric therapy should include coverage for organisms associated with any community-acquired pneumonia of unclear etiology, including agents with activity against both typical and atypical respiratory pathogens (*See Bartlett, et al. reference below*). Infectious disease consultation is recommended.

### **Outpatient Management of Possible SARS Cases**

If after evaluation, a patient meeting the SARS case definition is determined not to need hospitalization for medical reasons, these guidelines should be followed to prevent potential spread of SARS:

- The patient should have close medical follow up
- The patient should avoid congregate settings until fever, cough and rhinorrhea have resolved
- The patient should wear a surgical mask when around any household contacts; if the patient is unable to tolerate wearing a surgical mask, household contacts should wear a surgical mask
- All individuals in the home (patients and contacts) should wash their hands frequently with soap and water

As more epidemiologic and clinical information becomes available from the outbreak investigations in S.E. Asia, we expect that CDC will provide additional guidance on how long these measures for the management of possible outpatient SARS cases should remain in place. See the CDC website for updates: [www.cdc.gov/ncidod/sars/](http://www.cdc.gov/ncidod/sars/)

### **Interim Management of Exposures to SARS for Healthcare and other Institutional Settings** *Healthcare Settings*

Several healthcare workers have been reported to develop SARS after caring for patients with SARS. Although the infectivity and etiology of SARS currently are unknown, transmission to healthcare workers appears to have occurred after close contact with symptomatic individuals (e.g., persons with fever or respiratory symptoms) before recommended infection control precautions for SARS were implemented (i.e., unprotected exposures). Personal protective equipment appropriate for standard,

contact, and airborne precautions (e.g., hand hygiene, gown, gloves, and N95 respirator), in addition to eye protection, have been recommended for healthcare workers to prevent transmission of SARS in healthcare settings (<http://www.cdc.gov/ncidod/sars/ic.htm>). More general information on infection control in healthcare workers is available at <http://www.cdc.gov/ncidod/hip/GUIDE/infectcont98.htm>

CDC, in collaboration with state and local health departments, is developing a systematic approach for surveillance of SARS exposures and infection in healthcare workers for use by healthcare facilities. Additional information on surveillance materials will be forthcoming. Given the currently available information on the epidemiology of SARS in the United States, the following outlines interim guidance for the management of exposures to SARS in a healthcare facility.

- Exclusion from duty is recommended for a healthcare worker if fever or respiratory symptoms develop during the 10 days following an unprotected exposure to a SARS patient. Exclusion from duty should be continued for 10 days after the resolution of fever and respiratory symptoms. During this period, infected workers should avoid contact with persons both in the facility and in the community <http://www.cdc.gov/ncidod/sars/infectioncontrol.htm>
- Exclusion from duty is not recommended for an exposed healthcare worker if they do not have either fever or respiratory symptoms; however, the worker should report any unprotected exposure to SARS patients to the appropriate facility point of contact (e.g., infection control or occupational health) immediately.
- Active surveillance for fever and respiratory symptoms (e.g., daily screening) should be conducted on healthcare workers with unprotected exposure, and the worker should be vigilant for onset of illness. Workers with unprotected exposure developing such symptoms should not report for duty, but should stay home and report symptoms to the appropriate facility point of contact immediately. Recommendations for appropriate infection control for SARS patients in the home or residential setting are available at <http://www.cdc.gov/ncidod/sars/infectioncontrol.htm>.
- Passive surveillance (e.g., review of occupational health or other sick leave records) should be conducted among all healthcare workers in a facility with a SARS patient, and all healthcare facility workers should be educated concerning the symptoms of SARS.
- Close contacts (e.g., family members) of SARS patients are at risk for infection. Close contacts with either fever or respiratory symptoms should not be allowed to enter the healthcare facility as visitors and should be educated about this policy. A system for screening SARS close contacts who are visitors to the facility for fever or respiratory symptoms should be in place. Healthcare facilities should educate all visitors about use of infection control precautions when visiting SARS patients and their responsibility for adherence to them.

### ***Other Institutional Settings***

- To date, all patients with SARS reported to CDC in the United States have been either persons with a history of foreign travel to countries with SARS transmission or close contacts (e.g., family members or healthcare workers) to other SARS cases. Transmission has not been reported at schools, other institutions, or public gatherings in the United States. However, these recommendations concerning management of exposed healthcare workers could be adapted and

applied to other settings, including schools and other institutional settings, as deemed appropriate.

### **Interim Guidance on Infection Control Precautions for Patients with Suspected Severe Acute Respiratory Syndrome (SARS) and Close Contacts in Households**

Patients with SARS pose a risk of transmission to close household contacts and healthcare personnel in close contact. The duration of time before or after onset of symptoms during which a patient with SARS can transmit the disease to others is unknown. The following infection control measures are recommended for patients with suspected SARS in households or residential settings. These recommendations are based on the experience in the United States to date and may be revised as more information becomes available.

- SARS patients should limit interactions outside the home and should not go to work, school, out-of-home child care, or other public areas until ten days after resolution of fever and respiratory symptoms. During this time, infection control precautions should be used, as described below, to minimize the potential for transmission.
- All members of a household with a SARS patient should carefully follow recommendations for hand hygiene (e.g., frequent hand washing or use of alcohol-based hand rubs), particularly after contact with body fluids (e.g., respiratory secretions, urine, or feces). See <http://www.cdc.gov/handhygiene> for more details on hand hygiene.
- Use of disposable gloves should be considered for any direct contact with body fluids of a SARS patient. However, gloves are not intended to replace proper hand hygiene. Immediately after activities involving contact with body fluids, gloves should be removed and discarded and hands should be cleaned. Gloves must never be washed or reused.
- Each patient with SARS should be advised to cover his or her mouth and nose with a facial tissue when coughing or sneezing. If possible, a SARS patient should wear a surgical mask during close contact with uninfected persons to prevent spread of infectious droplets. When a SARS patient is unable to wear a surgical mask, household members should wear surgical masks when in close contact with the patient.
- Sharing of eating utensils, towels, and bedding between SARS patients and others should be avoided, although such items can be used by others after routine cleaning (e.g., washing with soap and hot water). Environmental surfaces soiled by body fluids should be cleaned with a household disinfectant according to manufacturer's instructions; gloves should be worn during this activity.
- Household waste soiled with body fluids of SARS patients, including facial tissues and surgical masks, may be discarded as normal waste.
- Household members or other close contacts of SARS patients who develop fever or respiratory symptoms should seek healthcare evaluation. When possible, in advance of the evaluation, healthcare providers should be informed that the individual is a close contact of a SARS patient. Household members or other close contacts with symptoms of SARS should follow the same precautions recommended for SARS patients.
- At this time, in the absence of fever or respiratory symptoms, household members or other close contacts of SARS patients need not limit their activities outside the home.

The Tennessee Dept. of Health appreciates the ongoing collaboration with the medical and laboratory community in responding to emerging infectious diseases issues in Tennessee and worldwide. The situation is evolving as the investigation progresses. Updates can be found on the CDC and WHO websites (see below) and we will provide additional alerts as necessary.

In addition, given heightened security level, we would like to request immediate reporting of **Any unusual increase or clustering of patients presenting with clinical symptoms that suggest an infectious disease outbreak** (*e.g., a sudden increase in patients presenting with unexplained pneumonia, respiratory failure or sepsis – especially if occurring in persons who are otherwise healthy.*)

#### REFERENCES

For additional information on this evolving outbreak, check the following websites:

Centers for Disease Control and Prevention: <http://www.cdc.gov>

World Health Organization <http://www.who.int/en/>

References on infection control precautions include:

1. Garner JS, Hospital Infection Control Practices Advisory Committee. Guideline for isolation precautions in hospitals. Infect Control Hosp Epidemiol 1996;17:53-80, and Am J Infect Control 1996;24:24-52. <http://www.cdc.gov/ncidod/hip/ISOLAT/Isolat.htm>
2. Bartlett JG, Dowell SF, Mandell LA, File Jr, TM, Musher DM, and Fine MJ. Practice Guidelines for the Management of Community-Acquired Pneumonia in Adults. Clin Infect Dis 2000;31:347-82. <http://www.journals.uchicago.edu/CID/journal/issues/v31n2/000441/000441.web.pdf>

## Please Post Important Notice to Clinicians:

Screen all Patients Presenting with Fever **and** Respiratory Illness for Severe Acute Respiratory Syndrome (SARS)

**A suspect case of SARS is a person presenting with:**

1. One or more signs or symptoms of respiratory illness, including cough, shortness of breath, difficulty breathing, hypoxia, or radiographic findings of pneumonia or acute respiratory distress syndrome  
AND
2. Fever ( $>38^{\circ}\text{C}$  or  $101.4^{\circ}\text{F}$ )  
AND
3. Travel within 10 days of onset of symptoms to an area with documented transmission of SARS **OR** close contact within 10 days of onset of symptoms with a person with possible SARS

Areas with documented transmission of SARS as of 3/29/03: Hong Kong, mainland China; Hanoi, Vietnam; Singapore and Toronto, Canada. For the most up to date list of affected areas, see the WHO website [www.who.int/csr/don/en](http://www.who.int/csr/don/en) and select the “Daily Summary of Reported Cases”.

**If you are evaluating a patient with a suspect case of SARS:**

1. Place a surgical mask on the patient immediately
2. Put the patient in airborne isolation immediately
3. Notify your Infection Control department or Infection Control practitioner on call
4. Report all cases of suspect SARS to your local/ regional Health Department or the Tennessee Dept. of Health on 615 741 7247.